FIG. 1

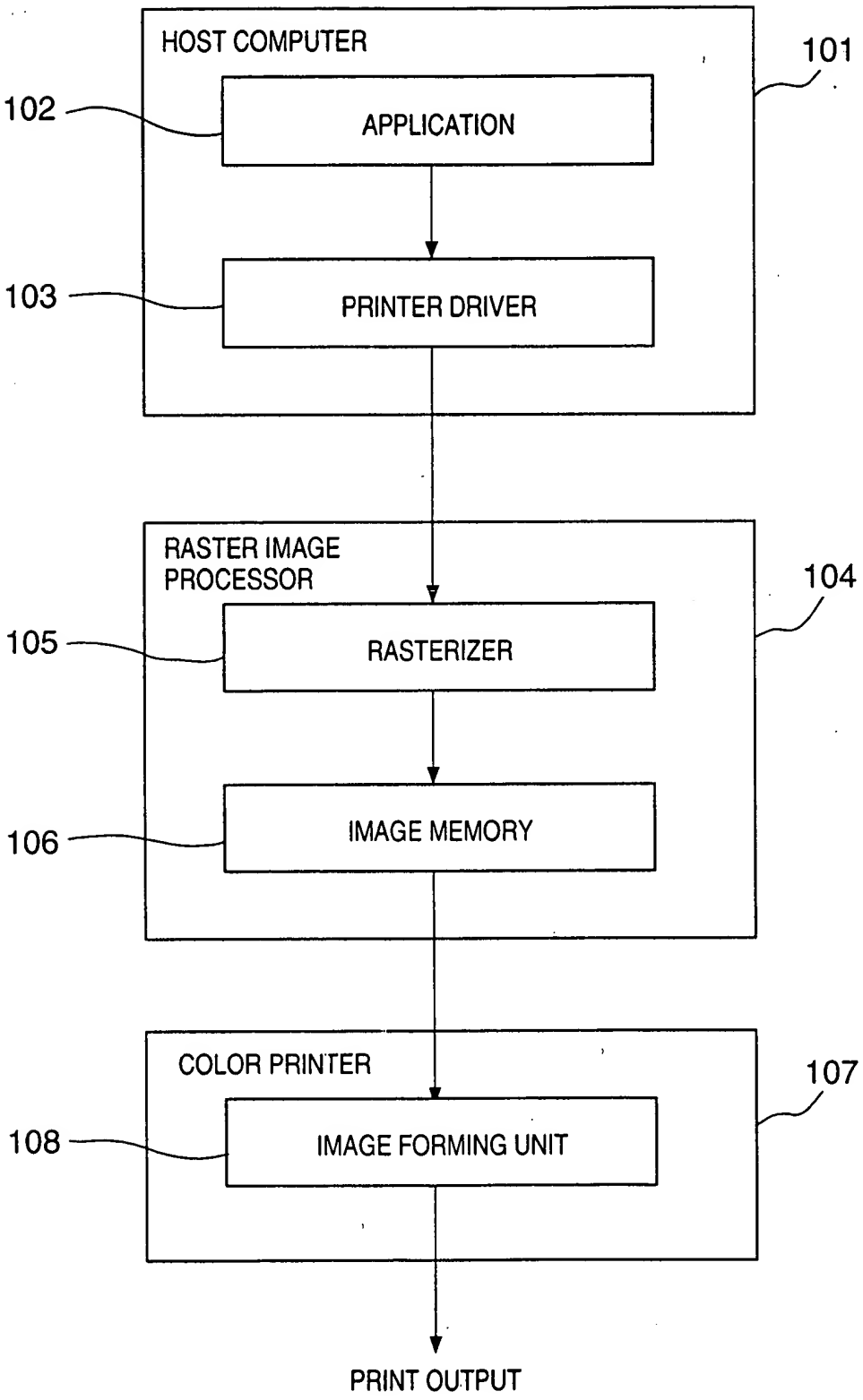
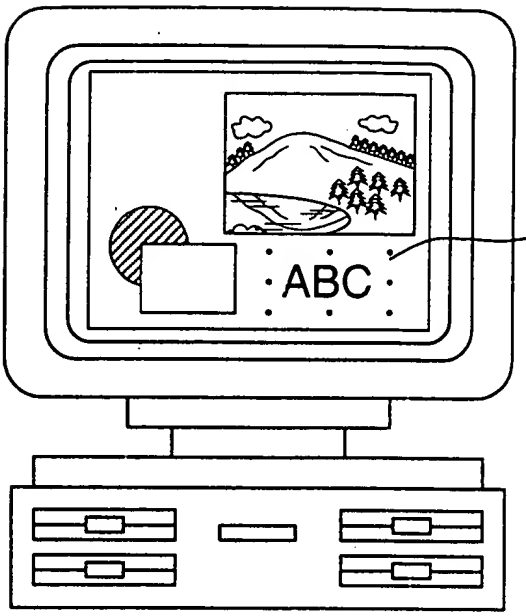

HOST COMPUTER
101
102
APPLICATION
103
PRINTER DRIVER
RASTER IMAGE PROCESSOR
104
105
RASTERIZER
106
IMAGE MEMORY
COLOR PRINTER
107
108
IMAGE FORMING UNIT
PRINT OUTPUT

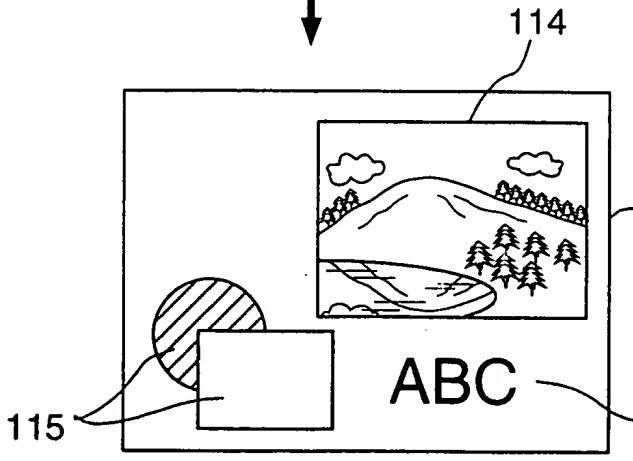
FIG. 2



111 DOCUMENT ON APPLICATION

112 PDL COMMAND STRING

- CIRCLE / COLOR = GRAY / SIZE = 100 / POSITION = x : 20, y : 40
- RECTANGLE / COLOR = WHITE / SIZE = 40 × 30 / POSITION = x : 25, y : 45
- CHARACTER / CHARACTER STRING = "ABC" / SIZE = 15 POINT / COLOR= BLACK / POSITION = x : 50, y : 50
- IMAGE / SIZE = 50 × 30 / POSITION = x : 30, y : 5 / IMAGE DATA = FFA032D0.....807236CAB0680EF5 /



113 BITMAP IMAGE ON IMAGE MEMORY

FIG. 3

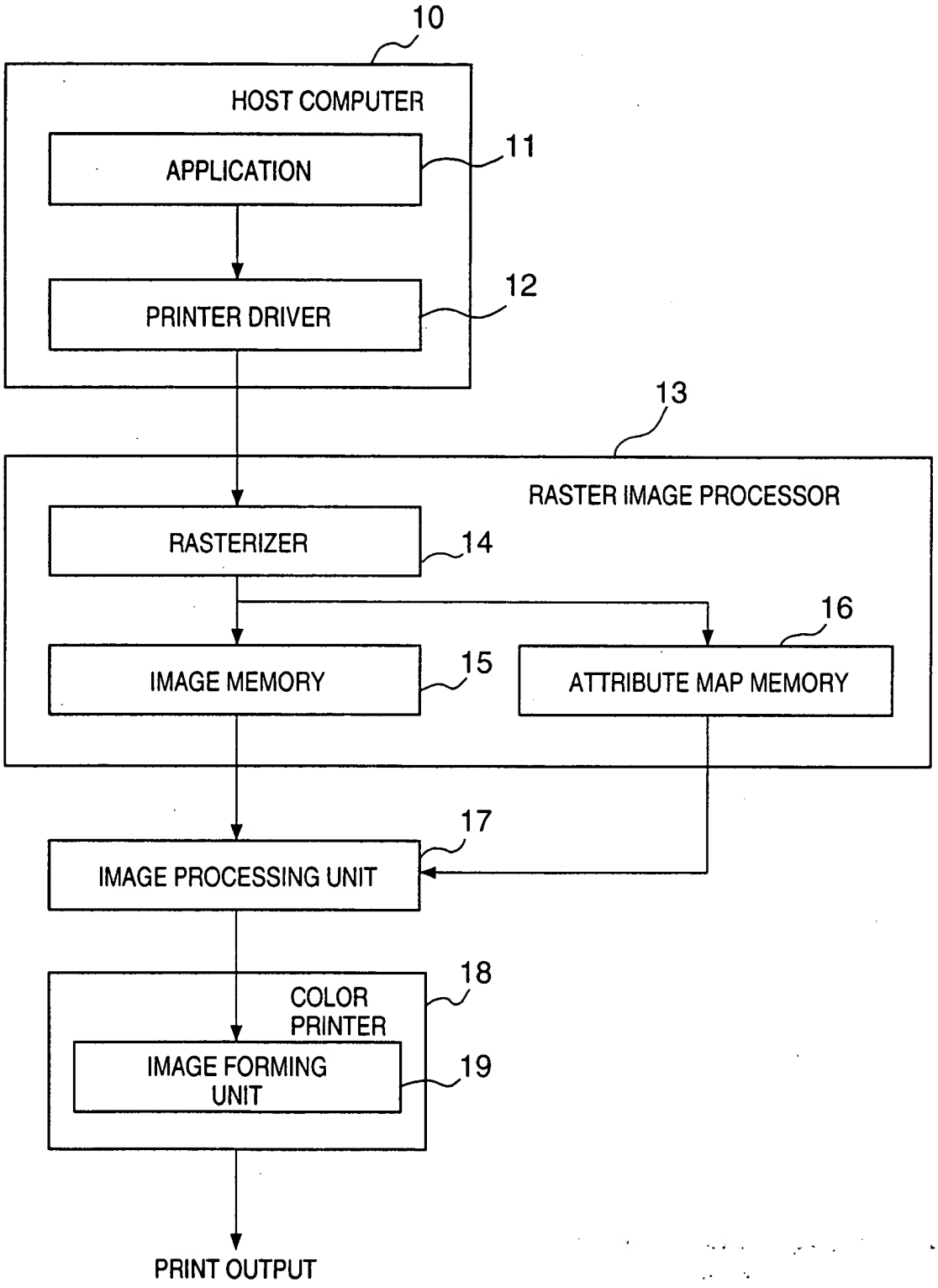

10
HOST COMPUTER
APPLICATION
11
PRINTER DRIVER
12
13
RASTER IMAGE PROCESSOR
RASTERIZER
14
16
IMAGE MEMORY
15
ATTRIBUTE MAP MEMORY
17
IMAGE PROCESSING UNIT
18
COLOR PRINTER
IMAGE FORMING UNIT
19
PRINT OUTPUT

FIG. 4

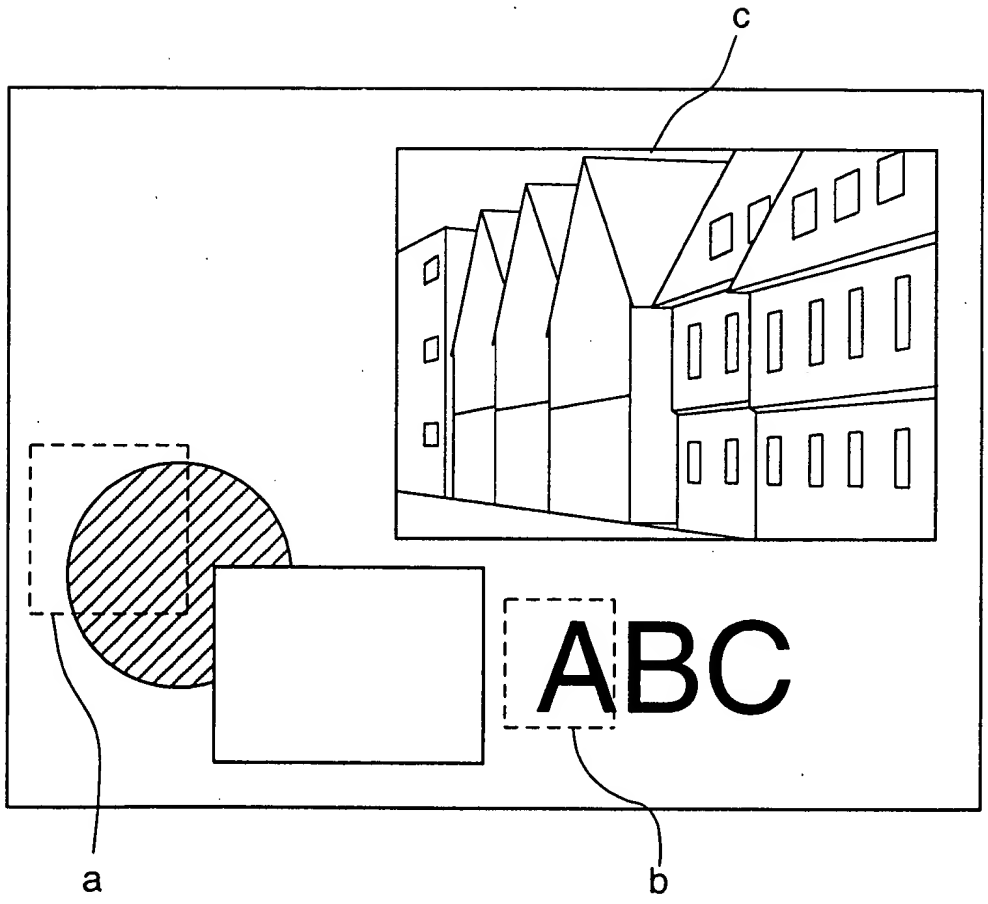


FIG. 5

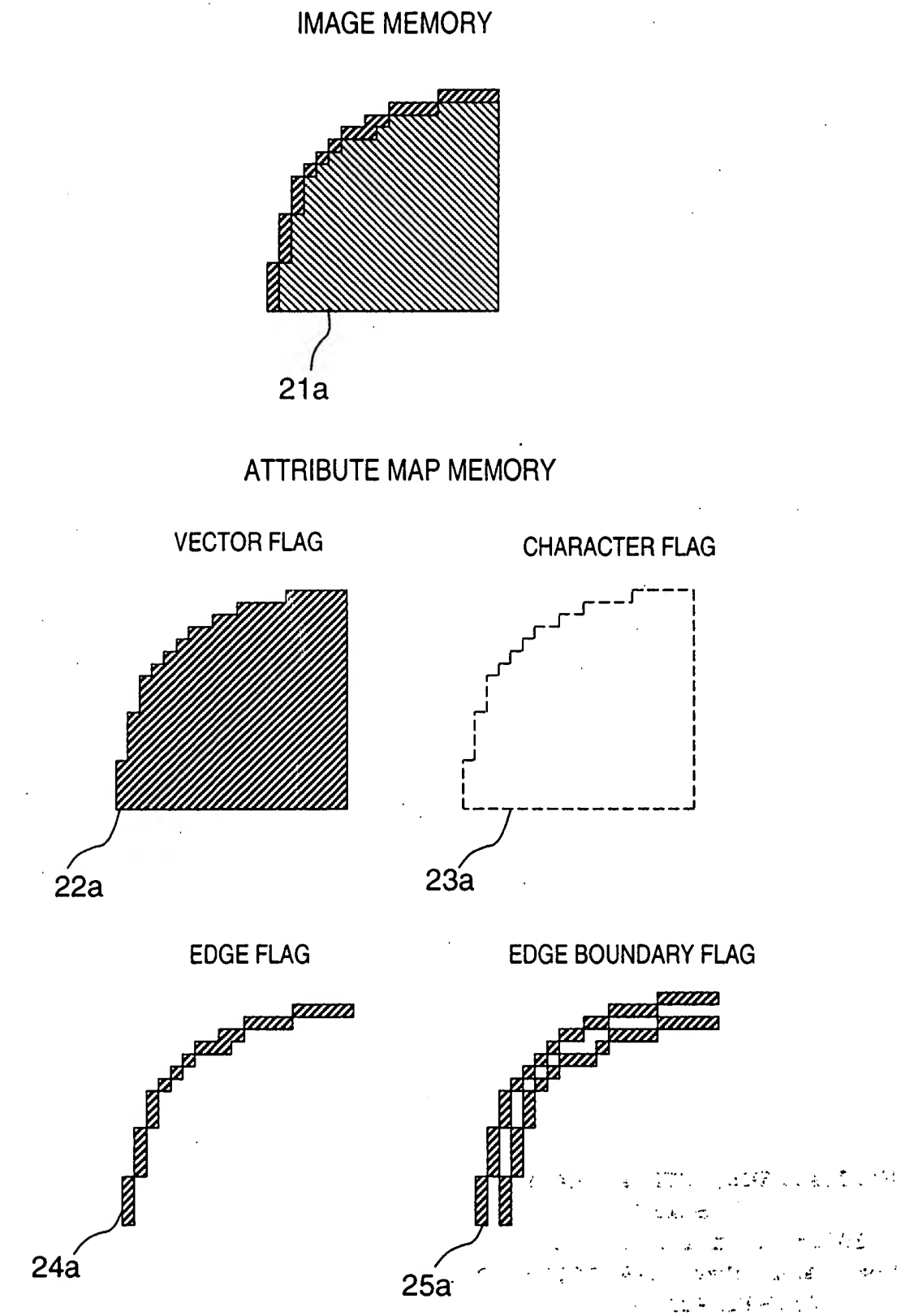


IMAGE MEMORY
21a
ATTRIBUTE MAP MEMORY
VECTOR FLAG
CHARACTER FLAG
22a
23a
EDGE FLAG
EDGE BOUNDARY FLAG
24a
25a

FIG. 6

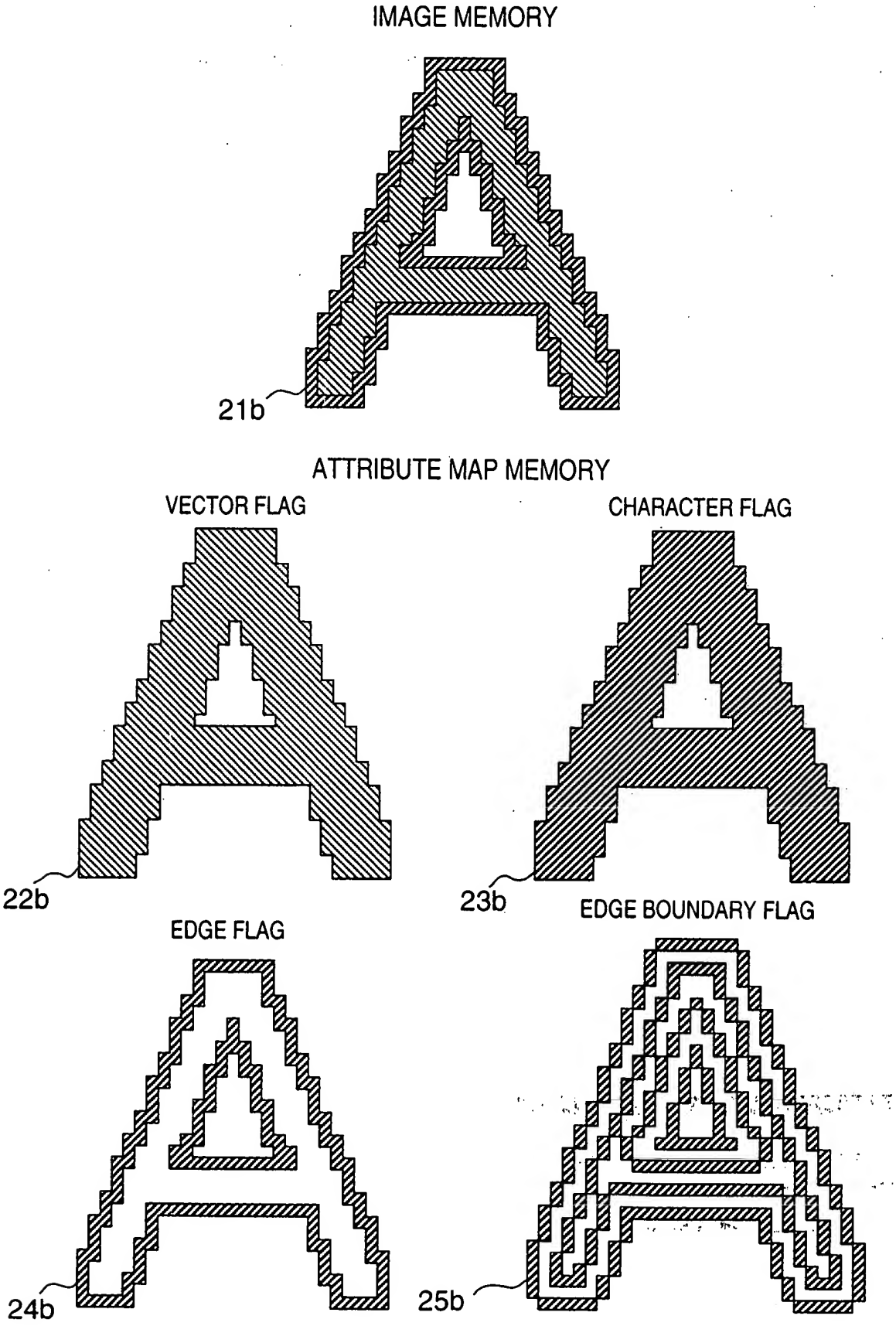


IMAGE MEMORY
21b
ATTRIBUTE MAP MEMORY
VECTOR FLAG
22b
CHARACTER FLAG
23b
EDGE FLAG
24b
EDGE BOUNDARY FLAG
25b

FIG. 7

25	50	125
100	75	150
225	200	175

FIG. 8

210	220	230	240	250
200	70	80	90	100
190	60	10	20	110
180	50	40	30	120
170	160	150	140	130

FIG. 9

172	176	180	184	188	192	196	200
168	84	88	92	96	100	104	204
164	80	28	32	36	40	108	208
160	76	24	4	8	44	112	212
156	72	20	16	12	48	116	216
152	68	64	60	56	52	120	220
148	144	140	136	132	128	124	224
254	252	248	244	240	236	232	228

FIG. 10

-1	0	0	0	-1
0	0	0	0	0
0	0	5	0	0
0	0	0	0	0
-1	0	0	0	-1

FIG. 11

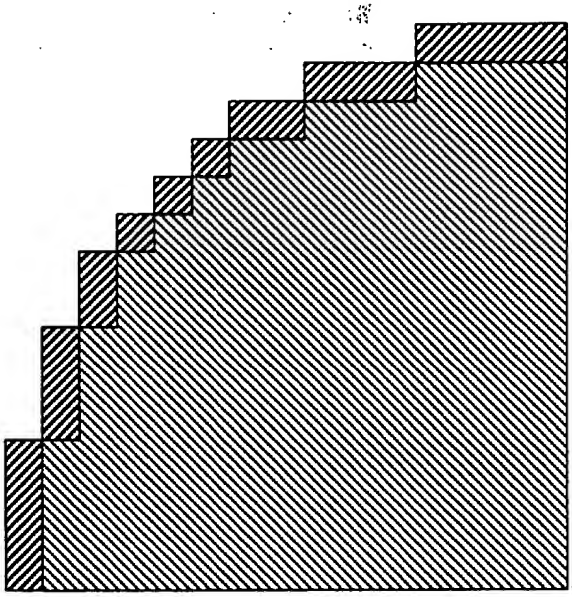


FIG. 12

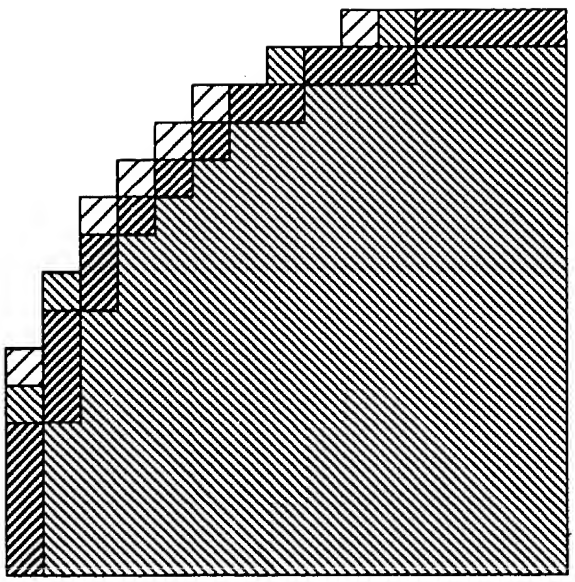


FIG. 13

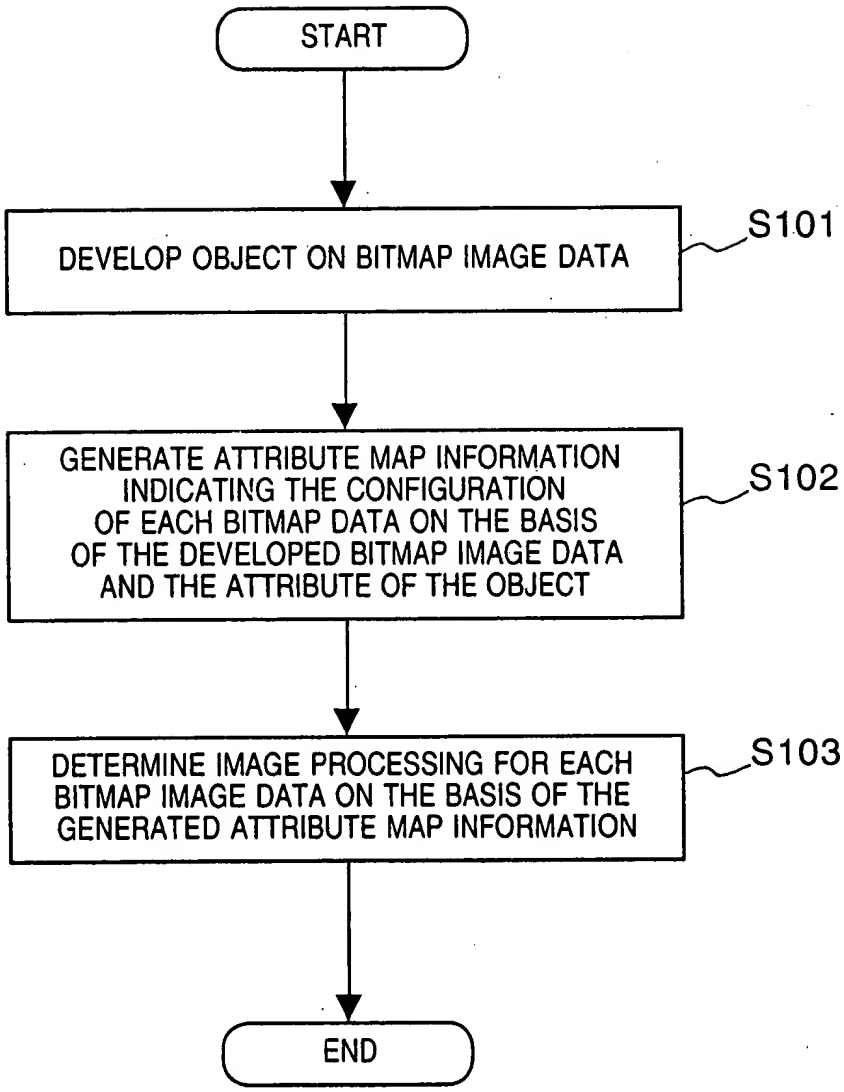

START
DEVELOP OBJECT ON BITMAP IMAGE DATA
S101
GENERATE ATTRIBUTE MAP INFORMATION INDICATING THE CONFIGURATION OF EACH BITMAP DATA ON THE BASIS OF THE DEVELOPED BITMAP IMAGE DATA AND THE ATTRIBUTE OF THE OBJECT
S102
DETERMINE IMAGE PROCESSING FOR EACH BITMAP IMAGE DATA ON THE BASIS OF THE GENERATED ATTRIBUTE MAP INFORMATION
S103
END

FIG. 14

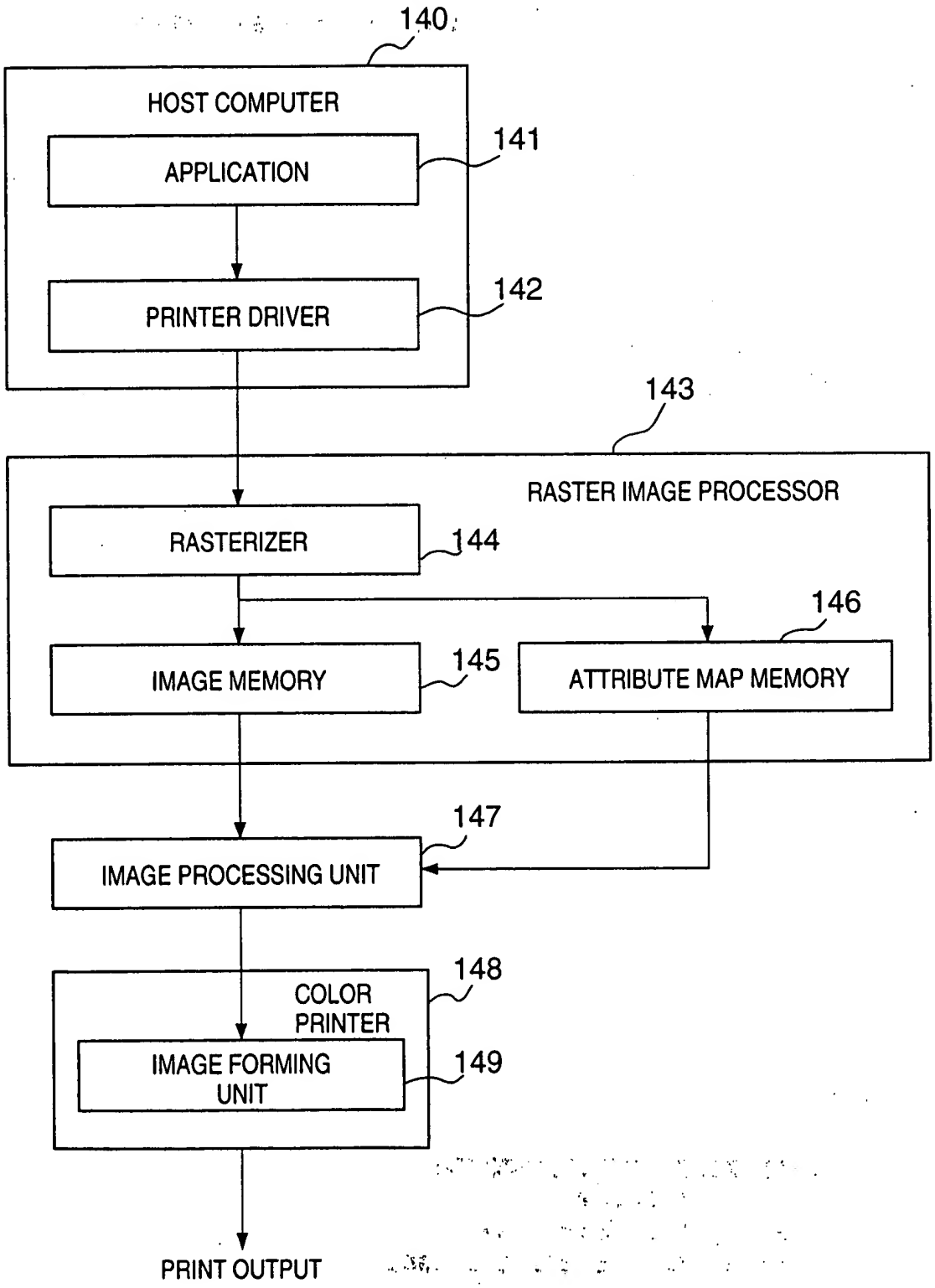

140
HOST COMPUTER
141
APPLICATION
142
PRINTER DRIVER
143
RASTER IMAGE PROCESSOR
RASTERIZER
144
146
IMAGE MEMORY
145
ATTRIBUTE MAP MEMORY
147
IMAGE PROCESSING UNIT
148
COLOR PRINTER
IMAGE FORMING UNIT
149
PRINT OUTPUT

FIG. 15

BIT		0	
INFORMATION		BITMAP FLAG	
		0	VECTOR
		1	BITMAP

FIG. 16

0	0	0	0	0	0	0	0	0
0	0	0	0	1	1	0	0	0
0	0	0	1	1	1	0	0	0
0	0	1	1	1	1	0	0	0
0	0	0	0	1	1	0	0	0
0	0	0	0	1	1	0	0	0
0	0	0	0	1	1	0	0	0
0	0	0	0	1	1	0	0	0
0	0	0	0	1	1	0	0	0
0	0	0	0	1	1	0	0	0
0	0	0	0	1	1	0	0	0
0	0	0	1	1	1	1	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

FIG. 17

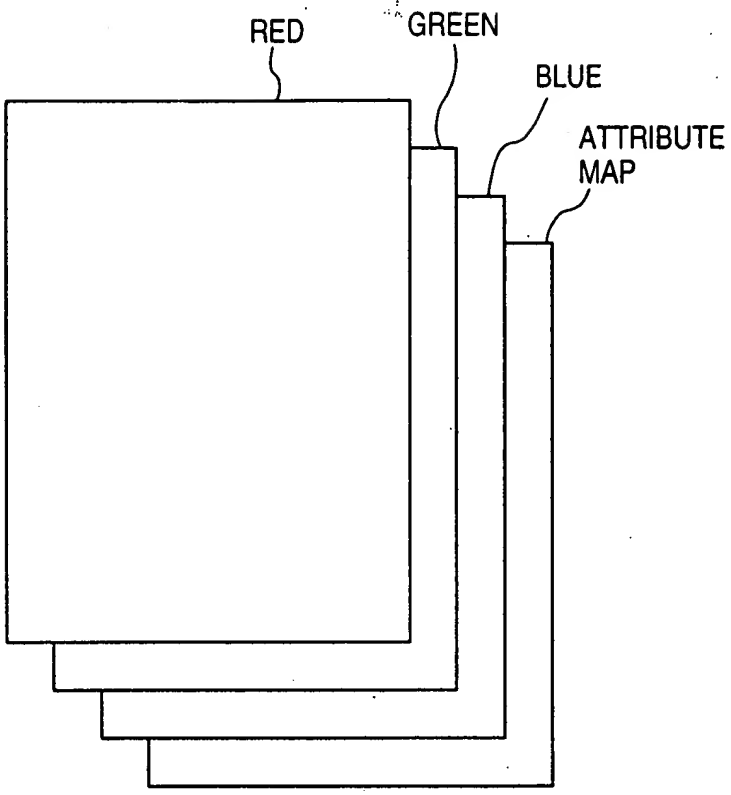

RED
GREEN
BLUE
ATTRIBUTE MAP

FIG. 18

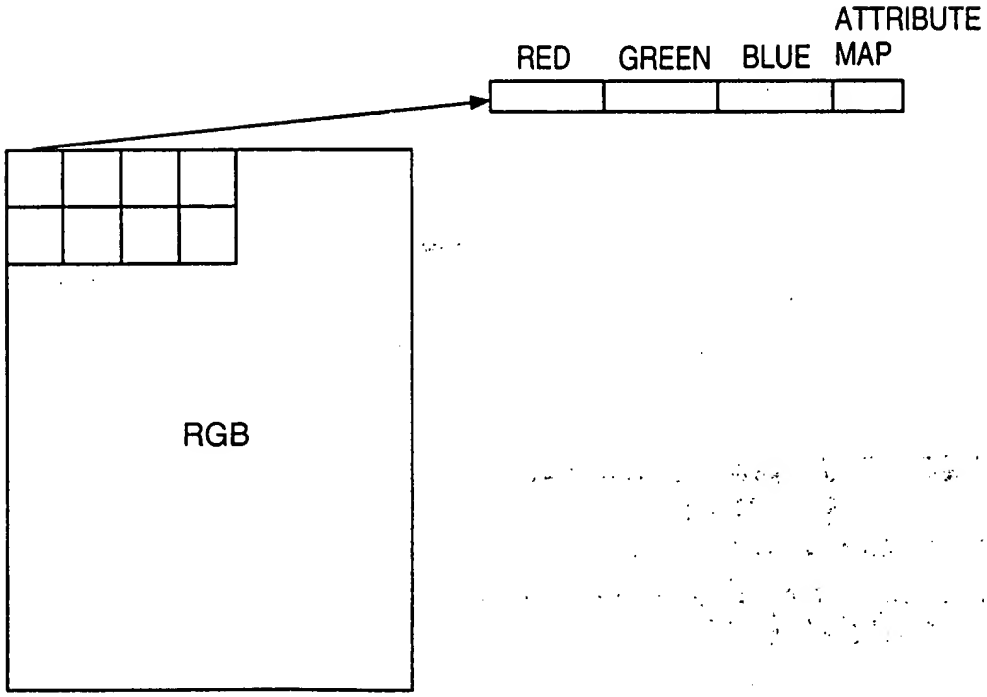

ATTRIBUTE MAP
RED
GREEN
BLUE
RGB

FIG. 19

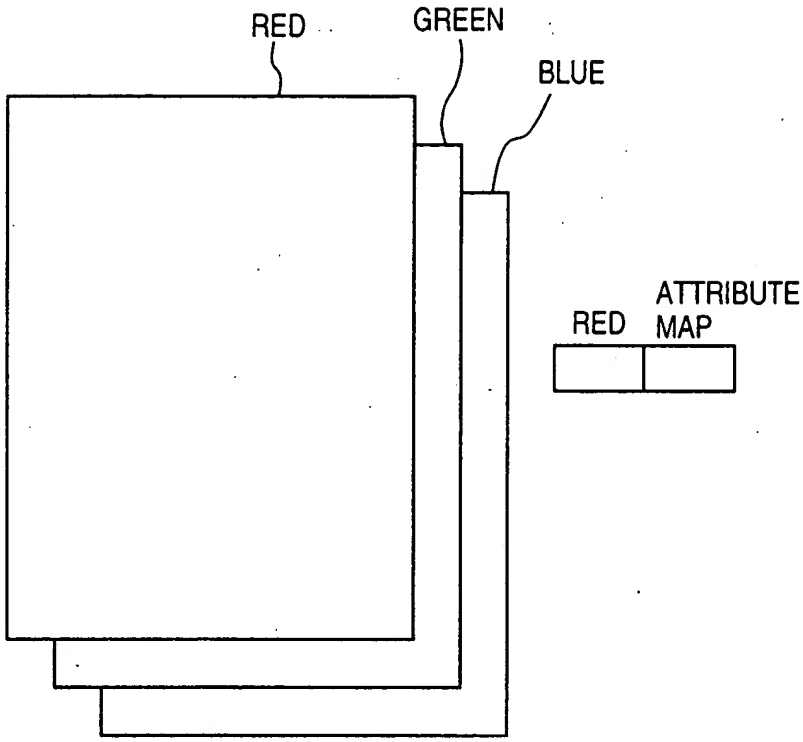

RED
GREEN
BLUE
ATTRIBUTE
RED
MAP

FIG. 20

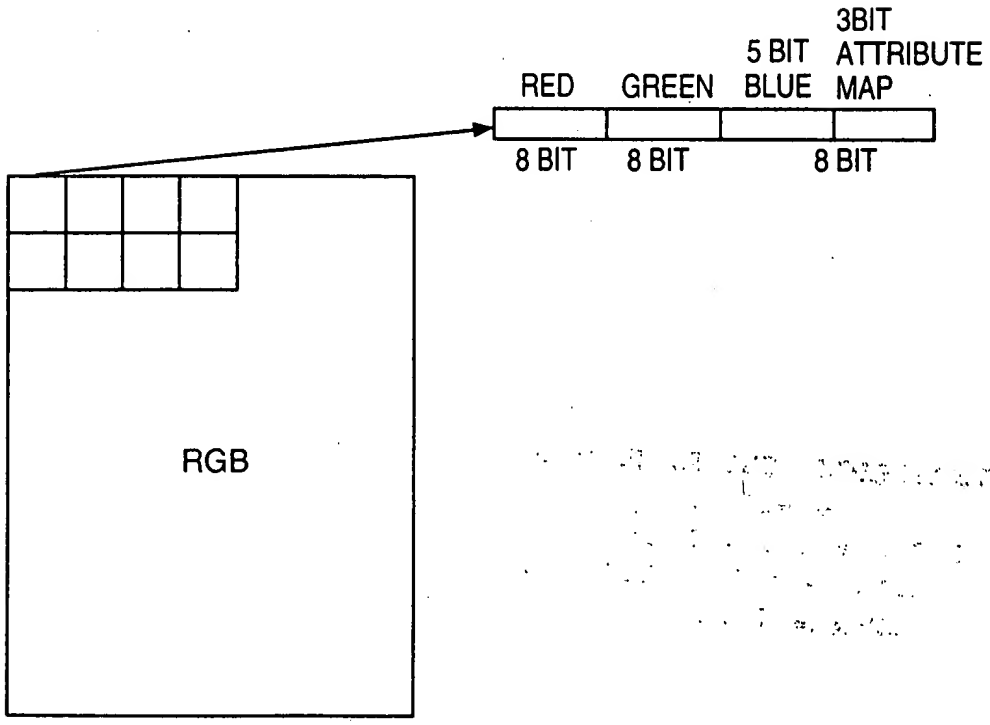

3BIT
5 BIT
ATTRIBUTE
RED
GREEN
BLUE
MAP
8 BIT
8 BIT
8 BIT
RGB

FIG. 21

25	50	125
100	75	150
225	200	175

FIG. 22

254	148	152	156	160	164	168	172
252	144	68	72	76	80	84	176
248	140	64	20	24	28	88	180
244	136	60	16	4	32	92	184
240	132	56	12	8	36	96	188
236	128	52	48	44	40	100	192
232	124	120	116	112	108	104	196
228	224	220	216	212	208	204	200

FIG. 23

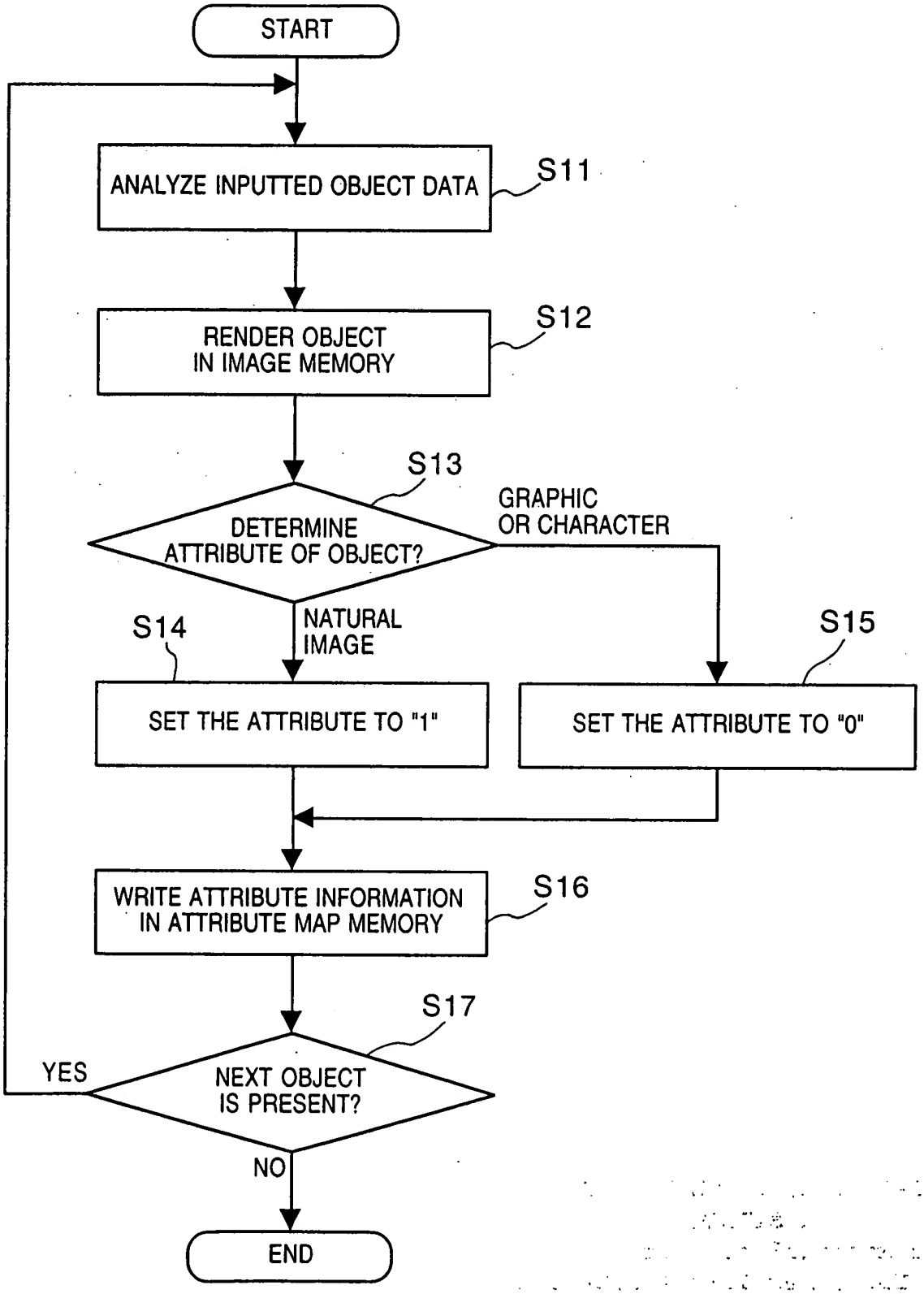
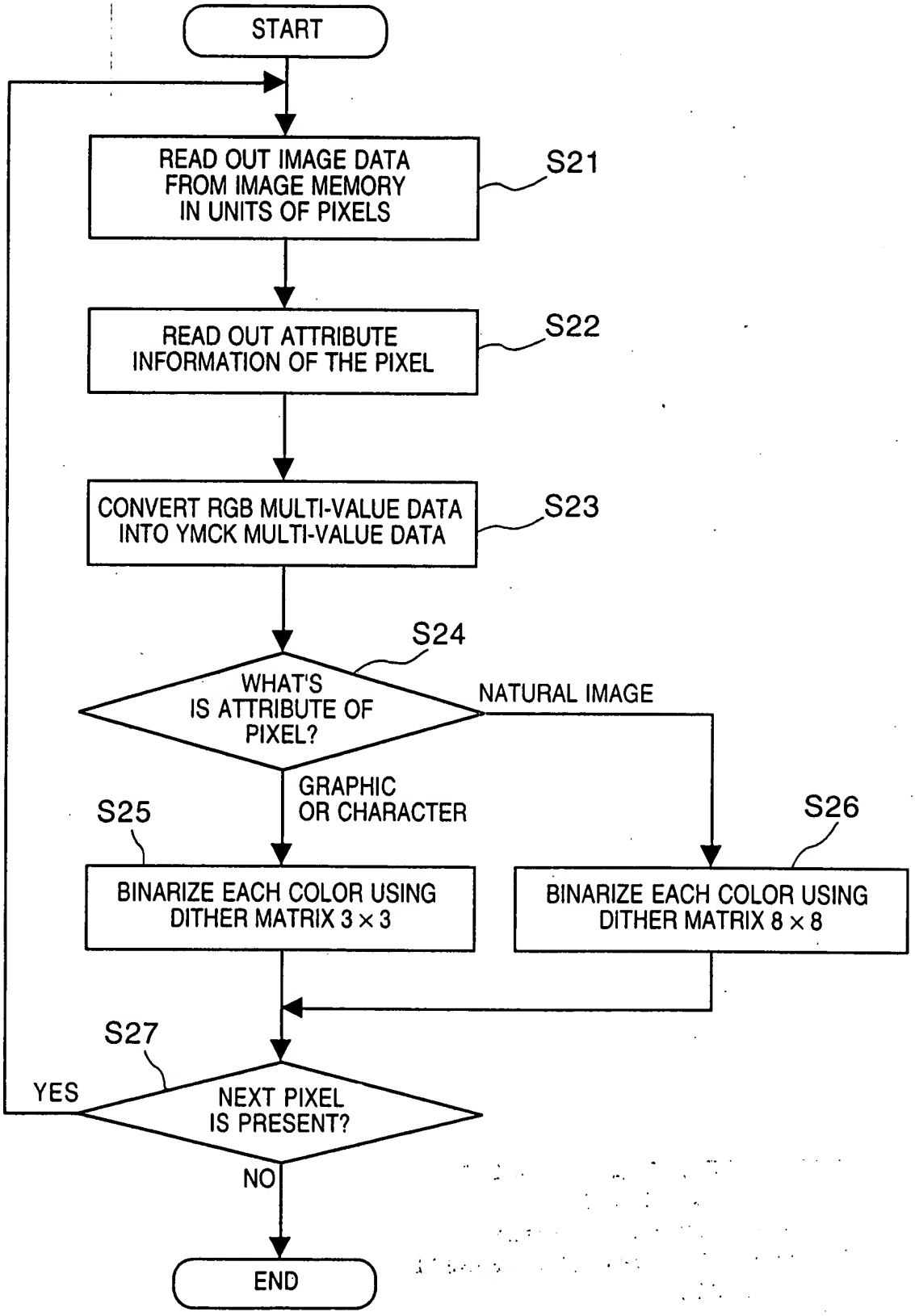

START
ANALYZE INPUTTED OBJECT DATA
S11
RENDER OBJECT IN IMAGE MEMORY
S12
S13
DETERMINE ATTRIBUTE OF OBJECT?
GRAPHIC OR CHARACTER
NATURAL IMAGE
S14
S15
SET THE ATTRIBUTE TO "1"
SET THE ATTRIBUTE TO "0"
WRITE ATTRIBUTE INFORMATION IN ATTRIBUTE MAP MEMORY
S16
S17
YES
NEXT OBJECT IS PRESENT?
NO
END

FIG. 24


START
READ OUT IMAGE DATA FROM IMAGE MEMORY IN UNITS OF PIXELS
S21
READ OUT ATTRIBUTE INFORMATION OF THE PIXEL
S22
CONVERT RGB MULTI-VALUE DATA INTO YMCK MULTI-VALUE DATA
S23
S24
WHAT'S IS ATTRIBUTE OF PIXEL?
NATURAL IMAGE
GRAPHIC OR CHARACTER
S25
S26
BINARIZE EACH COLOR USING DITHER MATRIX 3 × 3
BINARIZE EACH COLOR USING DITHER MATRIX 8 × 8
S27
YES
NEXT PIXEL IS PRESENT?
NO
END

6650T" nonEnD

FIG. 25

BIT		0		1	
INFORMATION		BITMAP FLAG		COLOR FLAG	
		0	VECTOR	0	MONOCHROME
		1	BITMAP	1	COLOR

FIG. 26

BIT		0		1		2	
INFORMATION		BITMAP FLAG		COLOR FLAG		CHARACTER FLAG	
		0	VECTOR	0	MONOCHROME	0	OTHER THAN CHARACTERS
		1	BITMAP	1	COLOR	1	CHARACTER

SUBSTITUTE SHEET

FIG. 27

BIT		01				2	
INFORMATION		OBJECT FLAG				CHARACTER FLAG	
		00	GROUND	10	CHARACTER	0	MONOCHROME
		01	GRAPHIC	11	BITMAP	1	CHARACTER

FIG. 28

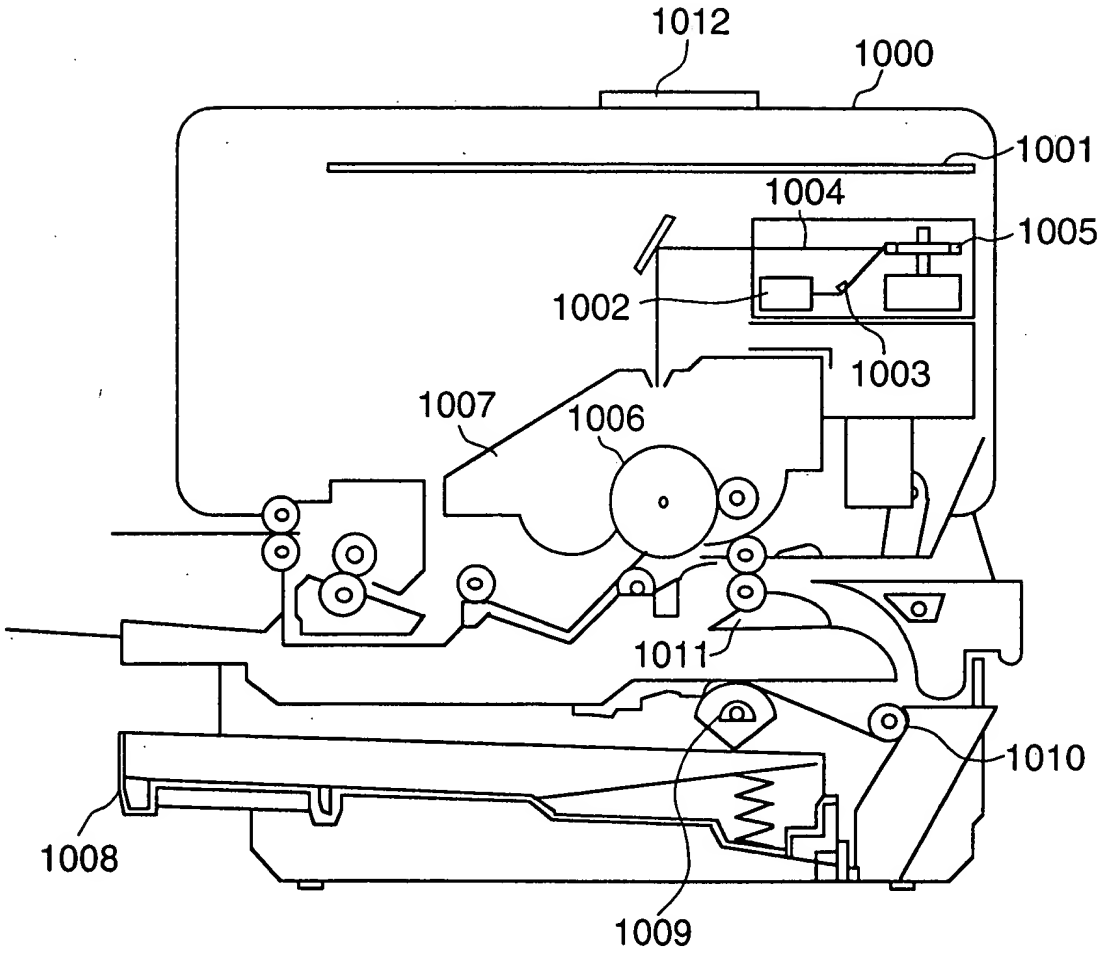

1012
1000
1001
1004
1005
1002
1003
1007
1006
1011
1010
1008
1009

FIG. 29

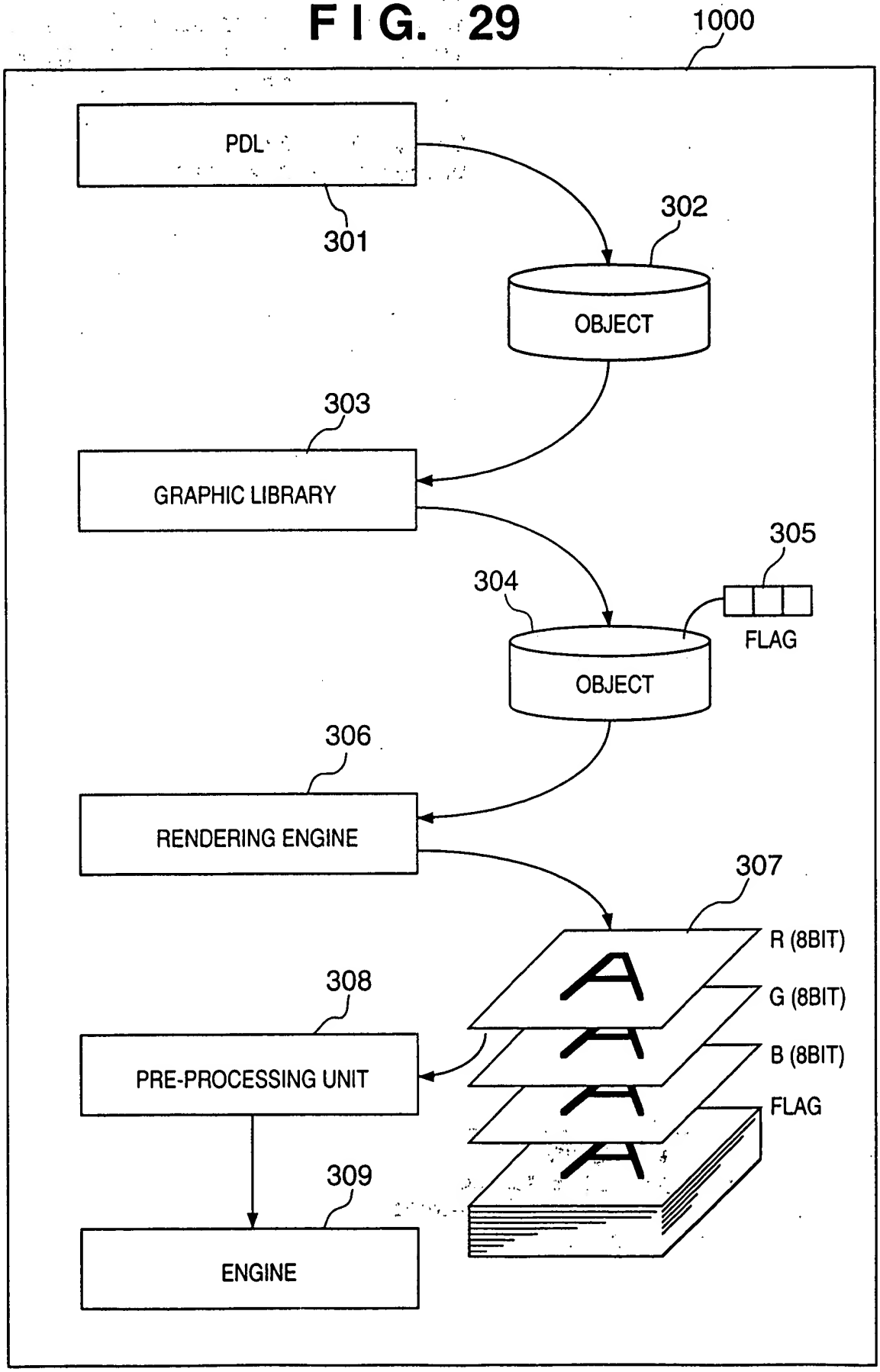
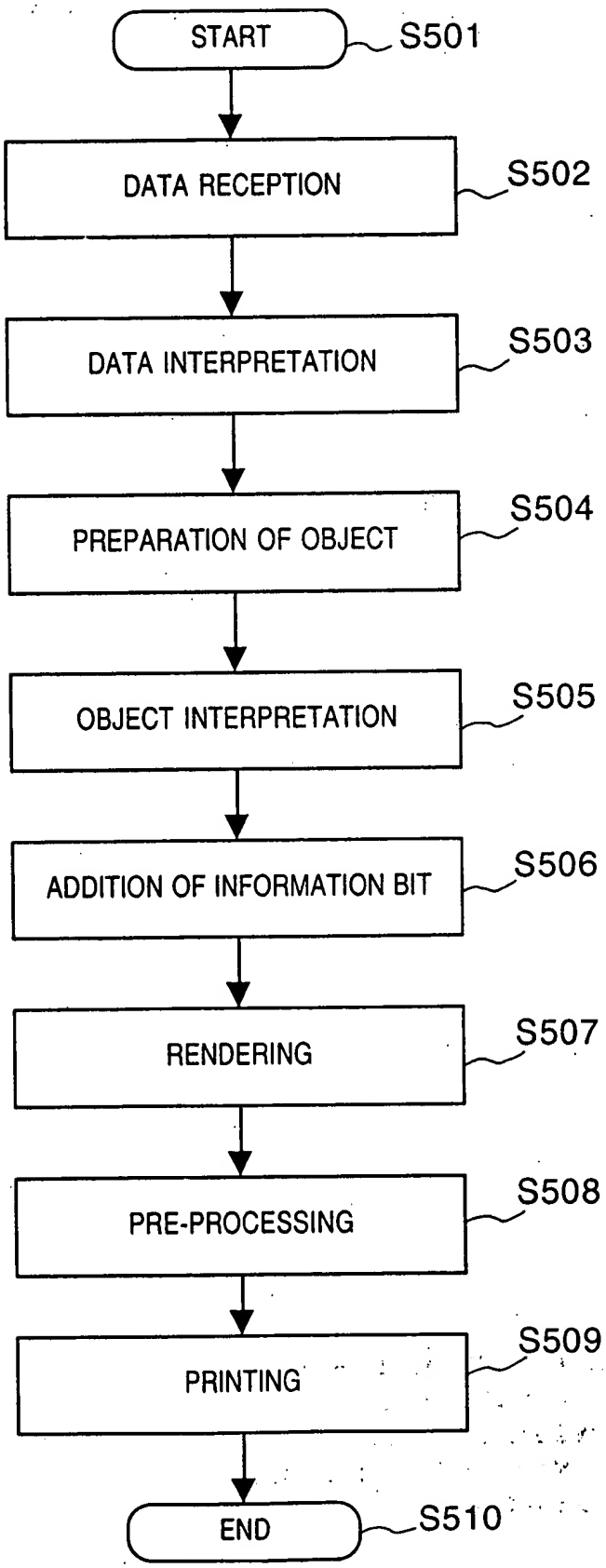

1000
PDL
301
302
OBJECT
303
GRAPHIC LIBRARY
305
304
FLAG
OBJECT
306
RENDERING ENGINE
307
R (8BIT)
G (8BIT)
B (8BIT)
FLAG
308
PRE-PROCESSING UNIT
309
ENGINE

FIG. 30

0 (BITMAP FLAG)	1 (COLOR FLAG)	2 (CHARACTER FLAG)	
0 (BITMAP)	0 (COLOR)	0 (OTHER THAN CHARACTERS)	BITMAP FLAG = 0
1 (VECTOR)	1 (MONOCHROME)	1 (CHARACTER)	
		0 (GRADATION PRIORITY)	BITMAP FLAG = 1
		1 (RESOLUTION PRIORITY)	

FIG. 31


START
S501
DATA RECEPTION
S502
DATA INTERPRETATION
S503
PREPARATION OF OBJECT
S504
OBJECT INTERPRETATION
S505
ADDITION OF INFORMATION BIT
S506
RENDERING
S507
PRE-PROCESSING
S508
PRINTING
S509
END
S510